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*JMTE PROJECT FORS 1034*

**TECHNICAL MEMORANDUM**

**FEBRUARY 20, 2019**

**TO:** Michael W. Battle  
Battle Law Firm, LLC  
P.O. Box 530, 1200 Main Street  
Myrtle Beach, SC 29528

**FROM:** J. Mark Teague, PE, CPM  
Owner and Principal  
J.M. Teague Engineering & Planning (JMTE)

**SUBJECT:** Special Event Traffic Management Plan  
Myrtle Beach, South Carolina

This report memo summarizes my review and findings of the subject matter.

**References and Items Reviewed to Prepare this Document**

1. Google Earth views of traffic pattern area
2. Site visit notes and pictures on January 17, 2019
3. Meeting with Myrtle Beach Police, Engineering, and Public Works staff on January 17, 2019
4. SCDOT Traffic Pattern Approval Letter
5. David Clarke Comparison Report provided by Battle Law Firm
6. Videos of previous Bike Fest from the Myrtle Beach area provided by Battle Law Firm
7. 2009 Manual on Uniform Traffic Control Devices (MUTCD)
8. Thomas Leath deposition
9. Transportation Planning for Planned Special Events (FHWA Publication)
10. South Carolina Code of Law 56-5-3150

## **Qualifications**

I am currently the principal and owner of J. M. Teague Engineering and Planning (JMTE), a regional transportation and engineering firm based in Waynesville, North Carolina. Prior to the formation of JMTE, I served in various transportation engineering capacities with the North Carolina Department of Transportation (NCDOT) where my primary roles over 18 years included working with local governments and other state agencies on traffic management plans, signing plans, special event coordination, incident management, traffic impact analyses, roadway signing analyses, traffic signal design and operation, speed limit establishment, and work zone traffic control. My NCDOT work encompassed almost 20 years across 3 different NCDOT divisions and over 100 local governments ranging in size from less than 500 population to 80,000 population. My transportation management plan experience while at NCDOT includes NASCAR races, parades, high profile funeral processions, presidential / dignitary visits, national conferences, international bicycle races, professional golf tournaments, small street festivals, and nationally renown festivals such as Bel Chere or the North Carolina Apple Festival.

JMTE is licensed to practice engineering in 6 states, including South Carolina. My primary role at JMTE is to lead, manage, and provide engineering oversight for a group of 18 professionals and support staff across four departments. The Engineering Department conducts studies and prepares reports or designs relating to traffic impact, intersection safety, traffic signal, and traffic management. Our traffic management plans have included street festivals, parades, television commercial filming locations, motion picture filming locations, large light shows, Christmas festivals, marathons, international bicycle races, and the recent World Equestrian Games event (only the second time ever in the US). JMTE's Planning Department develops pedestrian plans, bicycle plans, land use plans, wayfinding plans, small area plans, and conducts parking studies. Our planning department also serve as contracted planning staff for several municipalities in western North Carolina where they assume the role of City Planner, Zoning Director, and Code Enforcement. The JMTE Academy provides training for local governments, construction firms, and individuals in areas ranging from work zone safety, flagging, planning board roles, pedestrian safety, Manual on Uniform Traffic Control Device, and sign reflectivity. The JMTE Forensic Department provides engineering expertise and testimony for attorneys and insurance professionals on subjects such as traffic management, traffic safety, roadway design and safety, pedestrian planning and safety, work zones, and traffic signal design. Each JMTE department consists of approximately an equal portion of work load for the entire company.

## **Background**

JMTE was asked to review and evaluate a traffic management plan that has been established and implemented for the annual motorcycle gathering called Bike Fest activities that normally take place each Memorial Day weekend in the Ocean Boulevard area of Myrtle Beach. The concentration of Bike Fest is intense as the entire contingent of event participants and observers typically congregate in a space the length of Ocean Boulevard between 29<sup>th</sup> Ave North and 29<sup>th</sup> Avenue South (approximately 5 miles) inland

for 1 block (approximately 0.1 miles. This equates to approximately 0.5 square miles of total land area. Although Bike Fest has taken place in the Grand Strand area for a number of years prior, this particular traffic plan was first instituted in 2015 due to festival growth, increased concentration of participants in a smaller geographic area, and impacts to the health and safety of festival participants, Myrtle Beach residents / businesses, and non-Bike Fest visitors.

### **Purpose, Design, and Implementation of an Effective Traffic Management Plan**

There are several manuals, guides, and research material available that relate to traffic management planning, some of which are government produced or sanctioned. Woven throughout these manuals there is a common thread and message that each event is unique unto itself and few traffic management plans can be duplicated for different events. This is primarily because of the numerous nuances and differences, often subtle, that makes one event quite different from another. Another common thread is that the most effective traffic management plans use stakeholder input and feedback to ensure continuous improvement year over year for repeated events. Based on these types of manuals and 25 years practical experience, it can be accurately stated that an effective traffic management plan utilizes numerous factors. These factors can include all or some of the following: existing traffic volume, proximity of neighborhoods, types of roadways available for extra traffic, roadway structural limitations, governing body's resources, political advocacy from neighboring towns, health and safety of residents and businesses, presence of non-event visitors, duration of the event, number of event participants and observers, time of event, type of event (RV rally, bicycle race, motorcycle event, horse show, art show, sporting event, marathon, Christmas parade, etc).

Traffic management plans are also not based purely on number of visitors or event participants but on other factors such as where the visitors or event participants most heavily congregate, the transportation habits of visitors and event participants, the concentration of event activities, the history of the event, lessons learned from past events, and countless others that can only be identified by the local jurisdiction most impacted by the event.

The City of Myrtle Beach has numerous events throughout the year where varied traffic management plans have been designed and implemented. These include several art shows, music festivals, Christmas parade, and motorcycle events.

Traffic management plans are created and implemented to serve different stakeholders within each event. Event participants, local residents, government officials, event observers, and local businesses should be allowed to provide input and feedback both for inaugural traffic management plans as well as repeated plans to ensure continuous improvement opportunity.

After the consideration of stakeholder input and feedback, the jurisdiction or jurisdictions most impacted by the event will usually make the final decision on traffic management plan routing based on the factors previously identified. An important item to re-iterate is that there is no "canned" or established visitor /

participant threshold for the design of a particular traffic management plan. Public perception, law enforcement experience with past or similar events, and potential for a threat to public health or safety are critical components that local jurisdictions must weigh when deciding the routing of a traffic management plan.

Section 6A.01 of the MUTCD defines the traffic management plan responsibility as being the responsibility of the public body or official having jurisdiction for guiding roadway users.

**Standard:**

**10 TTC plans and devices shall be the responsibility of the authority of a public body or official having jurisdiction for guiding road users. There shall be adequate statutory authority for the implementation and enforcement of needed road user regulations, parking controls, speed zoning, and the management of traffic incidents. Such statutes shall provide sufficient flexibility in the application of TTC to meet the needs of changing conditions in the TTC zone.**

*MUTCD Excerpt Part 6A.01*

Typically, the final traffic routing plan “decision makers” will consist of jurisdiction law enforcement or planning department members. Once a traffic management plan route is established, other jurisdiction members such as traffic engineers or public works can become involved to ensure proper traffic control devices are deployed and implemented in accordance with the MUTCD or other traffic control design manuals.

Ultimately traffic management plans should fully address the health and safety of all event stakeholders, even if at the expense of stakeholder or non-event participant convenience. This can sometimes lead to restrictions such as detours, traffic movement restrictions, access restrictions, closed roadways, closed pedestrian walkways, security check points, and required offsite parking. Depending on the specific nature of the event as defined by the event factors previously mentioned, some of these restrictions can be significant.

Depending on the event specifics, some of the more common travel related restrictions include road user restrictions or complete closures. Many times roads are restricted to unidirectional movement to facilitate event traffic flow and emergency vehicle access. Often certain turning movements are restricted to eliminate vehicle conflicts and to reduce vehicle delays, especially for left turn movements. Sometimes turning movements in a particular direction are “forced” by law enforcement to create a “channel” of traffic that leads to a desired point within the traffic management plan. Pedestrians are often also impacted as normally available street crossing locations may be closed or relocated to other areas. Complete road closures are common, especially for events that utilize entire streets or where the impact to the health and safety of stakeholders and non-event visitors compromised.

### **Bike Fest Traffic Management Plan Assessment**

The established Bike Fest traffic management plan consists of several components.

Throughout the weekend duration of Bike Fest (6:00 AM Friday until the following Monday) pedestrian traffic along both sides of Ocean Boulevard from 29<sup>th</sup> Avenue North to 29<sup>th</sup> Avenue South is channeled onto the sidewalks by barricades and only allowed to cross Ocean Boulevard at marked crosswalks. This procedure was designed and implemented through past experiences and stakeholder input. Prior to this procedure, pedestrians were not physically restricted and would frequently cross Ocean Boulevard at will, often congregating in the street. This created a safety and health issue for motorists, visitors, businesses, and non-event visitors who needed to utilize Ocean Boulevard. This random crossing and congregating habit also posed a hazard for local law enforcement and emergency vehicles who may need to access the dozens of high-rise hotels and resorts along this stretch Ocean Boulevard. This pedestrian restriction procedure helps encourage safe pedestrian practices and restricts pedestrians to cross only at locations where they have the right of way and do not have to yield to oncoming traffic per SC State Code of Law 56-5-3150. Pedestrians in any other location along Ocean Boulevard must yield right of way to vehicular traffic when they enter the street.

On Friday, Saturday, and Sunday of Memorial Day Weekend Ocean Boulevard is converted to a one-way flow (north to south) beginning at 29<sup>th</sup> Avenue North and extending to 29<sup>th</sup> Avenue South near the Springmaid area. Barricades restrict right turns from Ocean Boulevard except at 21<sup>st</sup> Avenue North, Mr. Joe White Avenue, 9<sup>th</sup> Avenue North, 3<sup>rd</sup> Avenue South, 9<sup>th</sup> Avenue South, and 13<sup>th</sup> Avenue South. These streets lead directly to Kings Highway at a signalized intersection. The one-way flow is restricted to the southbound lane while the northbound lane is left open for emergency response to potential needs at the dozens of high-rise hotels and resorts along Ocean Boulevard.

Beginning at 10:00 PM each Bike Fest evening, and continuing until around 2:00 AM, the traffic management pattern is modified to best accommodate the most intense event activities for each day. Typically, during these 3 hours each evening, traffic congestion and event related activities / gatherings along Ocean Boulevard is most intense, and subsequently the health and safety of all stakeholders and non-event visitors is most at risk due to the increased influx and mix of pedestrian and vehicles.

Due to the critical need of keeping Kings Highway and US 17 Business unclogged for normal vehicle use and for access to two major hospitals, another element of the traffic management plan is introduced beginning at 10:00 PM each evening. This additional element was also designed and developed based on experience and stakeholder input. It was decided that instead of having the Bike Fest participants within the one-way southbound pattern on Ocean Boulevard turn right onto Kings Highway, travel 5 miles north, and get back onto Ocean Boulevard at 29<sup>th</sup> for a return trip, the event participants would be required to continue along an extended vehicle path to better disperse the heavy and consistent queue.



The path extension utilizes Kings Highway by turning right onto Kings Highway from the southern intersection of Ocean Boulevard for approximately 1.2 miles. Then the path turns left onto out Harrison Blvd / Bishop Parkway for approximately 4.5 miles to US 501. Finally, the path continues on Waccamaw Boulevard / Dick Scobee Drive for approximately 1.75 miles to US 501 at SC 31 a fully controlled access freeway. The event participants are then released onto either SC 31, US 501, or area local roads, and are free to choose whatever route they desire.

The northern access to Ocean Boulevard is also extended approximately 1.5 miles to the intersection of 29<sup>th</sup> Avenue North @ US 17.



Figure 1 – Traffic Management Plan Normal and Extended Route

If the event participants choose to make a return trip onto Ocean Boulevard they must travel back to the intersection of US 17 @ 29<sup>th</sup> Avenue South where they can re-enter the queue that leads to the intersection of 29<sup>th</sup> Avenue North and Ocean Boulevard. If an event participant desires to travel to the intersection of US 17 @ 29<sup>th</sup> Avenue North in the most direct manner, the trip between the release point at US 501 / SC 31 and the beginning of the queue at the intersection of US 17 @ 29<sup>th</sup> Avenue North is approximately 9 miles via SC 31 and Grissom Parkway. Numerous changeable message boards and positive guidance traffic control devices are installed along this route encouraging event participants of the most direct route back to Ocean Boulevard. In order to best accommodate local and non-event road

users and to ensure the best interest of health and safety of all road users, there are strategic access and crossing points along the traffic management plan. There are also a few restricted movements along Kings Highway southbound and at the intersection of Kings Highway @ 29<sup>th</sup> Avenue North. These restrictions may pose an inconvenience to non-event visitors, but it is a small expense to ensure better health and safety for all stakeholders.

All the roads or portions of roads on the traffic management plan routing design are under capacity and are available to handle additional vehicular traffic before dropping to un-acceptable Level of Service Thresholds (LOS) thresholds. The LOS measurement is a capacity / delay related measurement for roads that give planners and engineers an idea on the sustainability of particular roadway design. It is based on MUTCD methodology. A LOS of A indicates basic free flow movement where drivers are not impeded in any appreciable manner. A LOS of F indicates a “stop and go” condition with heavy congestion and delays. LOS B through E represent a continuum of less congestion to more congestion.

Ocean Boulevard between 29<sup>th</sup> Avenue North and 29<sup>th</sup> Avenue South is a 2-lane roadway with a center turn lane through much of the section. There are also strategic placements of exclusive turn lanes and pedestrian refuge islands to facilitate safe pedestrian crossing at selected mid-block locations. Although no official modeling has taken place, knowledge and observation indicates that Ocean Boulevard LOS varies widely from a LOS B during many mornings to a LOS F during many evenings. Ocean Boulevard is almost fully developed with hotels, resort properties, and attractions.

Kings Highway is a multilane facility that serves the immediate downtown area of Myrtle Beach. Except for the section used for the traffic management plan on the southern end, it is approximately 95% developed mostly with commercial properties. There are 15 traffic signals between 29<sup>th</sup> Avenue North and the southern intersection of Ocean Boulevard. Although no official modeling has taken place, knowledge and observation indicates that Kings Highway operates at a Level of Service (LOS) D through E during most of a typical day, with LOS likely reaching F during many peak tourist times.

Harrelson Boulevard / George Bishop Parkway is a 4-lane divided facility that serves the Myrtle Beach Airport and as an access to US 17 / US 501 from the southern Myrtle Beach area. Although this road connects 2 major corridors and serves several large shopping areas, knowledge and observation indicates that the LOS remains a C or D during much of the day.

Waccamaw Boulevard and Dick Scobee Drive are multilane facilities that primarily serve as connector / distributor roads between the interchanges of US 501 @ George Bishop Parkway and US 501 @ Dick Scobee Drive. Based on knowledge and observation the LOS seems to be an A or B for the majority of the day.

SC 31 is a high speed, controlled access facility that is built and performs much like an interstate highway. Based on observation and knowledge the LOS seems to be a B or C during the majority of the day.

Grissom Parkway is a multilane divided facility that connects the Myrtle Beach downtown area to SC 31. The short portion of this road that is used to connect SC 31 to US 17 is controlled access with other portions being a boulevard style collector type of facility.

As with the normal daytime one-way pattern for Ocean Boulevard, the pattern extension which occurs after 10:00 PM is closely monitored by law enforcement and event staff. More often than not, the number of event participants desiring to make multiple treks to Ocean Boulevard wanes as the night progresses and congestion along Ocean Boulevard begins to dissipate. When this happens the traffic management plan extension may be halted prior to 2:00 AM and the pattern is returned to its normal configuration.

### **Communication**

As mentioned previously, the established transportation management plan for the Bike Fest was designed and developed from prior years' experience and stakeholder input. As part of the continuous process improvement for transportation management plan betterment year over year, the City goes to great lengths to gather input from stakeholders and inform stakeholders of the upcoming event. Each January prior to the event, the City begins an extensive communication campaign with stakeholders. City staff holds 4 separate educational meetings for local residents and stakeholders to explain and gather input for the traffic management plan, and to advise of the planned traffic alterations, restrictions, and road closures and to inform of any access changes to critical community infrastructure such as medical facilities, law enforcement, fire stations, or pharmacies.

Additionally, the City provides transportation management plan brochures showing information, maps, and navigation instructions to airport users, local and regional media, Chamber of Commerce special target groups, City website, and to local residents in a door to door campaign.

In the days leading up to the traffic management plan implementation, dozens of changeable message signs are deployed at strategic locations around the City that informs all road users of the traffic management plan and the best ways to navigate it.

Besides the nearly 500 law enforcement personnel on hand to manage security and traffic movements, approximately 75 Myrtle Beach staff are available to assist with communication, sanitation, and other event logistics. 200 additional event staff volunteers are selected and trained to monitor intersections and provide instructions and navigation information to stakeholders. Every event staff person, including law enforcement, City staff, and volunteers, are trained to be fully knowledgeable about the transportation management plan, stakeholder's expectations, and how to handle emergencies.

Although there are certain "unbreakable" rules associated with some of the transportation management plan traffic restrictions, there is also a strong element of flexibility and judgement among event staff regarding the sensibility of certain traffic restrictions. For instance, if a family was arriving late to check into a resort and needed to access or cross an area that is normally blocked to traffic, they might be



allowed special access depending on factors such as how far into the restricted area they must travel. Another example routinely occurs on the south side of Ocean Boulevard. Stakeholders or non-event visitors needing to access the Springmaid area are usually allowed to contra-flow along the southernmost portion of Ocean Boulevard from Kings Highway to Springmaid Boulevard to eliminate having to travel the entire length of Ocean Boulevard.

Because many hotels and resorts along Ocean Boulevard have parking across the street, extensive communication is provided as part of the planning process to adequately let hotel patrons know to use other routes from Kings Highway to “back” access the parking lots. The patrons can then safely walk across Ocean Boulevard at any of the approximately 132 marked crosswalks from 29<sup>th</sup> Avenue North to 29<sup>th</sup> Avenue South.

### **Opinion and Conclusions**

Based on my review of this situation so far, this initial investigation I present the following opinion. These opinions are based on information previously provided and discovered, and all of my opinions are founded upon a reasonable degree of certainty based on traffic engineering principles and practices. Any additional information provided or discovered may impact this opinion.

The established traffic management plan for Bike Fest is appropriate and reasonable for the following reasons:

- The Bike Fest has established itself as a major motorcycle event that is concentrated in a small area (approximately 0.5 square miles). Based on prior year’s observations this intense population and presence of event participants has caused extreme congestion of both vehicles and pedestrians which has impeded emergency vehicles, created undue delay for non-event users, and created a risk for the health and safety of all event stakeholders.
- The pedestrian channelization method used along Ocean Boulevard encourages safe pedestrian practices and requires pedestrians to cross Ocean Boulevard at the only locations where they have right of way to motor vehicles.
- The traffic management plan was designed, prepared, and implemented through extensive stakeholder input (event participants, local residents, government officials, event observers, and local businesses).
- The traffic management plan extension that is in effect during the most intense hours of the event serves as a way to mitigate potential congestion on other north – south routes such as Oak Street, Kings Highway, and US 17. All of which serve critical community and regional facilities such as medical, law enforcement, fire stations, or pharmacies.

- The traffic management plan is adequately signed and marked in a manner that exceeds MUTCD guidelines and industry standards.
- Communication with stakeholders in advance and during the TMP exceeds my experience in dealing with large event traffic management plans and industry expectations.
- All event staff are trained to provide traffic management plan information to event participants and non-event visitors. This includes routing directions, positive guidance, authority to exercise flexibility on movement restrictions, and security alerts.
- The one-way pattern implemented on Ocean Boulevard and selected roadway closures are common techniques used widely in traffic management plans.
- The traffic management plan generally follows FHWA suggested guidelines for planning, implementation, and stakeholder input.
- The traffic management plan provides ample flexibility for non-event visitors who may need to “sneak” across a restricted area to best access their destination.
- The traffic management plan designated routes are adequate to handle extra event traffic without jeopardizing the desired LOS.